

more slender than female, otherwise almost identical both in color and structure.

Measurements of allotype: Length 1.34 mm.; head, length 0.180 mm., width 0.156 mm.; prothorax, length 0.162 mm., width (inclusive of coxæ) 0.300 mm.; pterothorax, width 0.300 mm.; abdomen, width 0.288 mm., tube, length 0.120 mm., width at base 0.063 mm., at apex 0.030 mm.

Antennal segments:	1	2	3	4	5	6	7	8
Length (μ)...	39	46	44	42	41	42	43	45
Width (μ)...	36	30	31	31	27	24	18	12

Total length of antenna, 0.342 mm.

Described from 1 female and 1 male, taken by Mr. A. H. Ritchie in the burrows of a Cerambycid beetle in the bark and cambium of Pimento, in the northern part of Jamaica, in April, 1916.

Closely related to *P. antennatus*, which is known only from Illinois, but easily recognized by the pale legs, the differently colored antennæ, the absence of a fore-tibial tooth, the shorter head, and the shorter terminal bristles, which in *antennatus* are very nearly twice the length of the tube.

NEW AEDES FROM THE MOUNTAINS OF CALIFORNIA

(Diptera, Culicidæ)

By HARRISON G. DYAR

The following new species of *Aedes* were met with in an investigation of the mosquitoes inhabiting the Sierra Nevada Mountains of California. These species are all of the early spring group, breeding in the pools left by the melting snow, with a single annual generation. At an altitude of 6,000 feet, pupæ were abundant May 25, and by the first week in June the breeding was complete; even the pools that still contained water or had only just thawed out were empty. Adults appeared by the first of June, and by the 15th the woods were filled with them in all directions.

Speaking especially of the Fallen Leaf Lake region, a region in the heart of the Sierras to the north of the high peaks and on the eastern side of the divide, *A. tahoënsis* is the commonest and earliest species, found everywhere, both in the hills and the pines in level country. It breeds in the earliest pools of clear water held in rocky land, its home being in the mountains, but it soon spreads everywhere. It was common in the early pools at the head of Fallen Leaf Lake, being often the only species present. It also bred in wave-pools at the lower end of the lake. Dispersal of the adults was in general downward, they being abundant in the pines at Tallac on June 17, though no breeding places were near. *A. cataphylla* is less abundant and less widely dispersed at Fallen Leaf. It was commonest at the foot of the trail to Angora Lakes at the head of the lake, rare at the outlet of the lake and absent at Tallac on Lake Tahoe. *A. hexodontus* breeds in early pools, but especially those of a marshy character, larvæ being taken from hoof-prints of cattle in the edge of a marsh. The adults were well distributed and toward the end of June replaced *A. tahoënsis* as the dominant species. *A. ventrovittis* is a rare species, taken only at one place near the outlet of Fallen Leaf Lake and then in small numbers. It is presumably a marsh breeder, though the larvæ were not found. *A. palustris* breeds in open grassy marshes, not in large numbers. Dispersal was general, adults being taken everywhere, although seldom commonly. *A. increpitus* is the slowest breeder of any of the early species, the larvæ lingering after all the others are gone, frequently in the same pools. They were abundant at the outlet of Fallen Leaf Lake with a downward dispersal, the adults being common at Tallac, about 2 miles from the breeding places, while only found a quarter of a mile up the lake and many days later.

The seasonal appearance of these mosquitoes varies with the altitude in the ratio of about a month in time to 1,000 feet of elevation. At Yosemite, at about 5,000 feet, all the species were about a month earlier than at Lake Tahoe, at 6,000 feet, while at Summit, at 7,000 feet, they were still another month

later, larvæ and pupæ of *tahoënsis* and *hexodontus* being taken there on July 2, 1916, in about the same stage that they were taken at Fallen Leaf on June 1, 1916.

Aedes tahoënsis, new species.

Male.—Integument black. Occiput with flat yellowish white scales on the sides, narrow curved ones on the vertex, the erect forked scales on the nape also pale; bristles at vertex pale, those along the eye-margins black. Mesonotum with narrow curved scales rather sparse, pale yellow-brown, paler on the sides and around the antescutellar space; two bands of dark brown, narrower scales, separated by a double row of normal pale scales on each side of the median bare groove; two similar shorter bands posteriorly subdorsally. Abdomen black, with broad basal segmental white bands; venter white scaled, the apical halves of the segments black. Legs black, femora whitish within; tibiæ with some white scales, especially inwardly. Length of wing, 4.5 mm., the wing scales black.

Genitalia: Side pieces over three times as long as wide, rounded at the tip; apical lobe prominent, with a few short setæ; basal lobe fan-shaped, with a row of setæ, a stout spine on the dorsal aspect; clasp filament slightly fusiform, curved, with a terminal inserted spine. Harpagones arising ventrally, long, the basal half of shaft minutely pilose, curving dorsally, the apical part of shaft smooth; filament sickle-shaped, with a sharp point, at base a slight double membranous ridge.

Female.—Similar, the venter of abdomen entirely pale scaled.

Larva with the central spine of the comb scales not larger than the others, the scale quite evenly feathered; upper head hairs in threes, lower single; anal segment not ringed; pecten of tube evenly spaced, followed by an 8-haired tuft.

Egg: Narrowly fusiform, evenly margined, not angled, one side a little flattened; antemicropylar end blunt, the other shortly conical with an annular mucilaginous cushion, the tip truncate; black, smooth, laid singly.

Type, Cat. No. 20352, U. S. Nat. Mus.

Closely allied to *A. lazarensis* Felt and Young and possibly

only a race of it. The principal differences are the larval head hairs. The coloration of the mesonotum is not very variable, though the dark brown stripes vary in width and distinctness. The marking is easily abraded. The abdomen of the female beneath frequently has paired apical black spots or bands as in the male. The females as flying appear a somber colored mosquito without prominent markings, the dorsal bands not being conspicuous. They vary considerably in size. They come readily to bite by day in the woods and were frequent about camp in the evening. Though seemingly eager to bite they are rather deliberate in selecting a spot and easily disturbed.

Bred from early pools filled by melting snow, Fallen Leaf, Lake Tahoe, California, latter part of May and first of June, 1916. The pools were clear, cold, and very transitory.

This species occurs also in the Yosemite Valley, judging from males bred from pupæ taken in the Little Yosemite, May 18, 1916. No larvæ were found, all having transformed. Another locality, presumably of this species, is: Summit, Placer County, California, July 19, 1915 (H. G. Dyar).

***Aedes hexodontus*, new species.**

Male.—Integument black. Head with pale straw-yellow scales, flat and appressed on the sides, narrow curved on the vertex, the black ground showing; vertical bristles pale straw-color, those along the eye-margins black; erect forked scales low on the neck, black; median groove bare. Mesonotum with narrow curved pale straw-yellow scales; two brown bands about five scales wide, of smaller dark brown scales, separated by a space three scales wide of normal straw-colored scales on each side of the median bare groove; an angled lateral bare line shows as a black mark; no subdorsal brown stripes; scales about antescutellar space paler. Abdomen with narrow basal segmental white bands; venter white-scaled, apices of segments and median band black. Legs black, femora whitish beneath; tibiæ and tarsi largely whitish scaled within. Length of wing, 4.5 mm., the wing-scales black.

Genitalia: Side pieces over three times as long as wide,

rounded at tip; apical lobe large, prominent, with short curved setæ; basal lobe large, conical, evenly setose. Harpagones long, the basal part of shaft minutely setose, other half smooth; filament sickle-shaped, with an angular membrane at the base outwardly.

Female.—Similar, the mesonotum overspread with brown, but showing also subdorsal short posterior brown stripes; venter of abdomen nearly all pale scaled, showing only traces of black apical bands and median stripe.

Larva with the head-hairs double or the lower in threes; pecten of the tube even, followed by a tuft of five hairs; anal segment ringed by the plate; comb-scales six, each with a very sharp central spine and slight lateral fringes.

Egg: Narrowly fusiform, smooth, not angled, one side flattened, ends roundedly pointed, the micropylar end blunter, shortly conical at tip, which has a small mucilaginous cushion; sculpturing fine and obscure; black, shining, laid singly.

This species is quite distinct. The coloration of the mesonotum is variable, distinctly banded or all dark brown or all golden yellow. The banded form is similar to *tahoënsis*, *lazarensis*, and *pullatus*, while the suffused brown form resembles *impiger*. Some specimens are very difficult to distinguish from *tahoënsis*, though in general the coloration is yellower. The venter of the abdomen is commonly all white or with paired apical black marks. The median black band is only very rarely present. The male genitalia resemble *campestris*, while the larva falls close to *abserratus*.

Type, Cat. No. 20353, U. S. Nat. Mus.

Bred from early spring pools in muddy hoof-marks in the edge of a marsh, in shallow grassy pools in a glade under poplar trees and, rarely, in pools along the lake filled by high waves and in mountain pools with *tahoënsis*. All these pools of a temporary character. Fallen Leaf, Lake Tahoe, California, last part of May and first of June, 1916.

Aedes ventrovittis, new species.

Female.—Integument black. Head with flat white scales low on the sides, all the vertex with very narrow curved sparse

white scales, denser along the eye-margins, brown low on the nape; vertical bristles pale, those along the eye-margins black. Mesonotum with dense narrow curved scales, brown and whitish intermixed, general effect lustrous pale yellow with an indistinctly double median brown band that becomes faint posteriorly; scutellum densely and continuously scaled with golden yellow, the antescutellar space not paler. First abdominal segment with golden yellow scales and bristles, the rest black, with rather narrow basal segmental white bands, widening on the sides and minutely incised on the dorsal line, broken on the last two segments; venter white-scaled, with a median black band, widening at apices of the segments; traces of sublateral subterminal patches. Wing-scales black, some patches of white ones at base of costa, discal and sixth veins, and outwardly a few of the outstanding ones on costa, first vein and upper edge of cell near its apex; outstanding scales numerous on upper edge of cell and second vein, sparse on third vein and upper fork of fourth, absent on fifth vein; length of wing, 4.5 mm. Legs black, the femora white beneath, knee-spots white; tibiæ and tarsi with many white scales intermixed, especially on the under side; tarsal claws toothed.

Type, Cat. No. 20355, U. S. Nat. Mus.

A captured female, Fallen Leaf, Lake Tahoe, California, June 2, 1916, taken biting by day under pines by a meadow at the north end of the lake by the sawmill.

In other specimens the venter of the abdomen has the black band crossed by transverse segmental subapical stripes. The white scales of the wings are principally confined to the long outstanding scales, the flat appressed scales being mostly black except at the base of the wing. The dorsal abdominal bands vary in the amount of incision, sometimes being broken on the dorsal line, sometimes scarcely indented.

This species is evidently of early occurrence and short lived. It was the first species flying at the north end of Fallen Leaf Lake (June 2) and was not taken after June 15. At Gold Lake, in Sierra County, altitude, 6,700 feet, Prof. W. B. Herms found *ventrovittis* on July 4, but two weeks later I was not

able to find any, although *tahoënsis* and *hexodontus* were out in swarms and *palustris* occasional.

***Aedes cataphylla*, new species.**

Female.—Integument black. Head with flat white scales on the sides, narrow curved ones on the vertex but mixed with rather broad curved ones, the narrow scales brown, the broad ones white; on each side of vertex a spot of very narrow, sparse, dark brown scales; erect forked scales black; vertical bristles pale, those along margins of eyes black. Mesonotum with coarse, narrow curved scales, brown, sparsely intermixed with white; anterior edge and shoulders white; a white tuft subdorsally centrally on each side, from which a narrow line of scales runs backward; scales over antescutellar space white. Scutellum with some narrow curved white scales on each lobe and a group of brown and black bristles. Abdomen black, with broad white basal segmental bands, widening on the sides; penultimate segment with some apical white scales; last segment and cerci with white scales intermixed; venter white, rather sparsely scaled, with a medioventral row of oval black spots and subapical sublateral black patches. Wing-scales narrowly cuneiform, black, with many white ones intermixed along the costa and first vein, some of the flat appressed scales of the costa being white, forming a distinct patch just beyond base, some of the flat scales of vein 1 white and a few of the long outstanding scales of vein 2 white; third vein with dense short scales forming a spot at the base, but few or no long outstanding scales, contrasting with the second and fourth veins, which have numerous outstanding scales. Legs black, with many white scales intermixed, especially on the under side, but the tarsi without pale rings; femora white beneath and with white knee-spots, intensified by a small black area preceding each. Tarsal claws toothed. Length of wing, 4.5 mm.

Type, Cat. No. 20354, U. S. Nat. Mus.

A captured female, Fallen Leaf, Lake Tahoe, California, June 11, 1916, taken biting by day in the woods at the south end of the lake.

The egg is thickly fusiform, from side view flat below, roundedly angled dorsally, scarcely more pointed at one end than the other, from dorsal view, roundedly angled on both sides, the antemicropylar end longer and slenderer. Length about 0.7 mm. Black, smooth, the ends rounded, with gelatinous annular cushion at micropyle. Laid singly.

The females come readily to bite, but are deliberate in selecting a place and easily alarmed. Two specimens, although having inserted the proboscis, seemed unable to draw blood and were finally captured with the stomach empty.

Two specimens taken at Glenbrook, Nevada, June 5, 1916, are apparently of this species.

***Aedes increpitus*, new species.**

Male.—Integument black. Head with pale yellowish scales, flat on the sides, narrow curved on the vertex and shading to brownish there; vertical bristles pale, those along the margins of the eyes black. Mesonotum with coarse narrow curved scales, pale yellowish, broadly replaced by smaller dark brown ones in two contiguous dorsal bands and a broad subdorsal posterior one; the pale scales are left in a scattering dorsal line and in a distinct subdorsal one, beginning in a spot in the middle of the mesonotum and running to antescutellar space; scales about this space broadly pale. Abdomen with basal segmental white bands, rather broad; venter sparsely whitish scaled, with a median row of segmental ovate black patches and sublateral apical spots. Legs with black and white scales intermixed, femora whitish beneath; tarsi largely black after the first joint, each joint with a basal white ring except the last joint, which is wholly black. Length of wing, 4 mm., the wing scales black, but mixed with white along the costa and vein 1.

Genitalia: Side pieces over three times as long as wide, rounded at tip; apical lobe prominent with a few small setæ; basal lobe small, rounded, uniformly finely setose; harpagones moderately long, curved, minutely setose toward base, the filament long and curved, with a lateral expansion, like a slender foot with pointed heel.

Female.—Similar; head broadly brown at vertex, defining a white lateral spot; venter of abdomen whiter, the median spots and sublateral subapical black patches more distinct; last tarsal joint black as in the male; abdominal bands widening on the sides, on the penultimate segment running to the tip; last segment black.

Larva with the air tube thick and rounded, not over three times as long as wide, the pecten without detached teeth and followed by a 3-haired tuft; anal segment not ringed by the plate which is incised on the side; comb-scales in a large patch, the central spine longer than the others but not stouter, the scale rather evenly fringed; upper head hairs in twos or threes, lower single or double or both double.

Type, Cat. No. 20350, U. S. Nat. Mus.

In some specimens, especially the largest, earliest emerging ones, there is a small white ring or spot on the fifth tarsal joint. The white rings are generally broad, never very narrow.

The egg is narrowly fusiform, one side flattened, smooth, not angled, the ends roundedly pointed, the micropylar end shortly conical and with a mucilaginous cushion; black, shining, laid singly.

This species combines the male genitalia of *abfitchii* with the larva of *stimulans* and is thus a synthetic form. In *sonsoni* the genitalia are similar, but the larva also is that of *abfitchii*, having a long tube with detached pecten teeth. The coloration is practically identical in all of these forms. In the east there are three species of this, the *cantans* group, indistinguishable as adults. In the Sierras there are but two and they can generally be easily distinguished.

This species was very common in the Yosemite Valley in May, 1916. Males were seen swarming by day in dark woods or, in early morning, in camp or along the road. Usually no definite swarm was seen, but single males or in small numbers drifting and circling about, although sometimes in fairly definite clusters. The females are ready biters. Larvæ occurred in all the pools, preferring small detached ones, though they occurred even in large pools in old beds of the river where there was still a slight current. At Fallen Leaf Lake they

occurred in beach pools filled by high waves and seepage through the gravel, in marsh pools, but only very rarely in the clear cold mountain pools or the larger grassy marshes. The larvæ linger after the early snow-pool species have completely disappeared.

The following records also doubtless appertain to this species: Glenbrook, Nevada, August 25, 1915 (H. G. Dyar); Tahoe Tavern, Placer County, California, August 15, 1915 (H. G. Dyar); Eureka, California, May 22 to June 6, 1903 (H. S. Barber); Fieldbrook, California, May 26, 1903 (H. S. Barber).

***Aedes palustris*, new species.**

Male.—Integument black. Head with flat yellowish white scales on the sides, narrow curved ones above, smaller, sparser, brown scales in a patch each side of vertex, the erect forked scales black in these patches, elsewhere white; median groove bare, with dense whitish scales on either side; vertical bristles whitish, those along ocular margins black. Mesonotum with narrow curved pale yellowish scales, narrower brown ones in two broad contiguous bands and two posterior short subdorsal stripes, the pale normal scales forming only subdorsal and lateral lines and a border around antescutellar space. Abdomen black, with broad, even, basal segmental white bands; venter with subapical black bands and a medioventral black line. Legs black; femora and tibiæ with white scales intermixed, the femora white beneath; tarsi with broad white rings at the bases of the joints, on the first three joints on front and mid legs, on all five joints on hind legs. Length of wing, 4.5 mm., the scales black except a few white ones along costa, first and fourth veins.

Genitalia: Side pieces over three times as long as wide, rounded at tip; apical lobe long, arm-shaped, with a few short setæ; basal lobe large, obtusely conical, densely setose. Harpagones moderate, the basal part of shaft minutely pilose, apical part smooth; filament sickle-shaped, without expansion.

Female.—Similar; mesonotum with rather broad areas of

pale narrow curved scales over the shoulders; posterior abdominal segments with white scales at both base and tip and a few scattered in the black area; wings brindled black and white, white scales on all the veins, about half as numerous as the black ones; femora with more white scales than black ones; tibiæ with the scales about evenly divided; tarsi with the rings broad, the last hind tarsal joint half white.

The larva has the head with the upper tuft in threes or fours, lower single; pecten of the air-tube with long, well separated teeth, but perfectly even, followed by a 6-haired tuft, the tube over four times as long as wide, regularly tapered and a little curved. Comb a moderate patch of about 14 scales, the scale evenly fringed with spinules, the central spinule longest; lateral abdominal hairs double.

Egg: Fusiform, one side flattened; central third nearly cylindrical, antemicropylar end slenderly tapered, the other more abruptly conical with a mucilaginous cushion; black, smooth, laid singly.

Type, Cat. No. 20351, U. S. Nat. Mus.

Breeding in temporary open grassy pools, Little Yosemite Valley, larvæ and pupæ, May 18, 1916; marshes at north end of Fallen Leaf Lake and between Tallac and El Tahoe at the south end of Lake Tahoe, June 1-2, 1916.

The abdominal scales are mixed with brown. In a captured female the pale scales are very extensive, on the apices as well as the bases of the segments, and forming a diffused white dorsal band the whole length. In a bred female the pale scales are reduced, the basal white bands narrow and broken at the sides, separated from the lateral spots. No apical pale scales in this specimen except on the last two segments. Various intergrades occur.

This is a very distinct species of the *cantans* group, recognizable by the large number of white scales on the wing veins, some scales being present on every vein. Specimens with the white dorsal band well developed on the abdomen present a very unique appearance.